

Claims

1. An image display apparatus in which a plurality of narrow tubes are disposed so as to extend across a substrate, each narrow tube containing phosphor material and enclosing discharge gas, the
5 image display apparatus displaying an image by applying voltages to the narrow tubes so as to cause discharges to occur therein, and converting ultraviolet light generated as the discharges occur into visible light via the phosphor material,

wherein, the plurality of narrow tubes include at least one
10 first narrow tube and at least one second narrow tube, and the phosphor materials respectively contained in the first and second narrow tubes differ from each other, and

the discharge gases respectively enclosed in the first and second narrow tubes differ from each other in at least one of composition
15 and pressure.

2. The image display apparatus of Claim 1,

wherein, the phosphor material forms a layer in each first narrow tube and each second narrow tube respectively.

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3. The image display apparatus of Claim 1, further comprising:

a plurality of first electrodes arrayed so as to extend in a length direction of the narrow tubes, and

a plurality of second electrodes arrayed so as to extend in
25 a direction which intersects the length direction of the narrow tubes.

4. The image display apparatus of Claim 3,

wherein, the plurality of first electrodes are provided between

the substrate and the narrow tubes.

5 5. The image display apparatus of Claim 4,
 wherein, the plurality of second electrodes are attached to
the plurality of narrow tubes.

6. The image display apparatus of Claim 1, further comprising:
a layer composed of MgO being formed inside each narrow tube.

10 7. The image display apparatus of any of Claim 1 to Claim 6,
 wherein, the phosphor material contained in the first narrow
tube is of at least one color selected from red, green and blue,
and

 the phosphor material contained in the second narrow tube is
15 of at least one color other than the at least one color selected
for the phosphor contained in the first narrow tube.

 8. An image display apparatus in which a pair of substrates
are disposed opposite one another such that an internal space is
20 formed therebetween, electrodes and at least two types of phosphor
layer are provided between the substrates, and discharge gas is
enclosed in the internal space,

 the image display apparatus displaying an image by applying
voltages to the electrodes so as to cause discharges to occur in
25 the internal space, and via the phosphor material, converting
ultraviolet light generated as discharges occur into visible light,

 wherein, the internal space is divided into a first space
provided with a first phosphor layer and a second space provided

with a second phosphor layer, and

the discharge gases respectively enclosed in the first and second spaces differ from each other in at least one of composition and pressure.

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9. The image display apparatus of Claim 8,

wherein, the internal space is partitioned into a plurality of spaces by a plurality of barrier ribs provided in a stripe pattern, and

10 each groove formed between the plurality of barrier ribs is closed at one end.

10. The image display apparatus of either Claim 8 or Claim 9,

15 wherein, the first phosphor layer is of at least one color selected from red, green and blue, and

the second phosphor layer is of at least one color other than the at least one color selected for the first phosphor layer.

20 11. An image display apparatus manufacturing method, the method comprising:

a gas enclosing step of enclosing discharge gas within a plurality of narrow tubes containing phosphor material; and

25 a disposing step of disposing so as to extend across a substrate the plurality of narrow tubes in which the discharge gas was enclosed in the enclosing step.

12. The image display apparatus manufacturing method of Claim 11,

wherein, the plurality of narrow tubes include at least one first narrow tube containing phosphor material, and at least one second narrow tube containing phosphor material, the phosphor materials respectively contained in the first and second narrow tubes differing from each other, and

wherein, in the gas enclosing step, the discharge gases respectively enclosed in the first and second narrow tubes differ from each other in at least one of composition and pressure.

13. The image display apparatus manufacturing method of Claim 11, further comprising:

a first electrode arraying step of arraying a plurality of first electrodes so as to extend in a length direction of the narrow tubes, and

a second electrode arraying step of arraying a plurality of second electrodes so as to extend in a direction which intersects the length direction the narrow tubes.

14. The image display apparatus manufacturing method of Claim 13,

wherein, the first electrode arraying step takes place before the disposing step, and

the second electrode arraying step takes place after the disposing step.

15. The image display apparatus manufacturing method of Claim

11, further comprising:

before the gas enclosing step,

a phosphor layer forming step of forming a phosphor layer inside each of the plurality of narrow tubes.

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16. The image display apparatus manufacturing method of Claim 11, further comprising:

before the gas enclosing step,

an MgO layer forming step of forming a layer composed of MgO
10 inside each of the plurality of narrow tubes.

17. The image display apparatus manufacturing method of Claim 16, wherein,

the MgO layer forming step includes:

15 an application sub-step of applying paste that includes MgO to an inside of each of the plurality of narrow tubes; and
a firing sub-step of firing the applied paste.

18. The image display apparatus manufacturing method of Claim 20 16, wherein,

the MgO forming step takes place after the phosphor layer forming step.

19. An image display apparatus manufacturing method
25 comprising: an outer vessel forming step of forming an outer vessel in which pair of substrates are disposed opposite one another such that an internal space is formed therebetween, electrodes and at least two types of phosphor layer are provided between the substrates,

and discharge gas is enclosed in the internal space, the internal space is divided into a first space provided with a first phosphor layer and a second space provided with a second phosphor layer, and first and second exhaust tubes connecting to the first and second spaces respectively are provided; and

an exhausting-enclosing step of, via the first and second exhaust tubes respectively, exhausting the first and second spaces and enclosing discharge gas therein,

wherein, in the exhausting-enclosing step,

the discharge gases respectively enclosed in the first and second spaces differ from each other in at least one of composition and pressure.